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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/511,929	10/18/2004	Michael Seibert	NREL 02-09	2030

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EXAMINER

GITOMER, RALPH J

ART UNIT	PAPER NUMBER
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1657

DATE MAILED: 12/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/511,929

Applicant(s)

SEIBERT ET AL.

Examiner

Ralph Gitomer

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

The IDS received 10/18/04 has been entered and claims 1-16 are currently pending in this application. Please update the continuing information in the specification.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains: Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of each of Ghirardi and Melis in view of Seibert.

Ghirardi (Trends in Biotech) entitled "Microalgae: A Green Source of Renewable H<sub>2</sub>" teaches on page 507 last paragraph bridging to page 508, *C. reihardtii* cells were incubated in sulfur deprived media under continuous illumination and the rate of H<sub>2</sub> accumulation was measured.. See Figs. 3 and 4 which show H<sub>2</sub> vs time.

Melis (Plant Physiology) entitled "Sustained Photobiological Hydrogen Gas Production Upon Reversible Inactivation of Oxygen Evolution in the Green Alga *Chlamydomonas reinhardtii*" teaches on page 128 column 2 first paragraph, samples for H<sub>2</sub> evolution measurements were transferred from the culture bottle with syringes. On page 130 See Fig. 2 and Table 1 which show hydrogen generated vs time and other factors.

The claims differ from the above references in that they specify the hydrogen determining is in situ where the references teach removing gas samples and analyzing the hydrogen content in a device separate from the culture.

Seibert (US 2001/0041351 A1) entitled "Apparatus for Rapid Biohydrogen Phenotypic Screening of Microorganisms Using a Chemochromic Sensor" teaches on page 4 paragraph 40, a hydrogen sensor film was placed on top of the plates with cultures to generate hydrogen. The hydrogen induced chemochromic sensor color change results were used to determine which individual colonies of algae produced hydrogen.

It would have been obvious to one of ordinary skill in this art at the time the invention was made to perform the method of the primary references and detect the hydrogen generated in situ because the primary references teach a method of measuring generated hydrogen where samples are removed and determined with standard laboratory equipment and Seibert teaches growing the same algae for the same function as the primary references and measuring the hydrogen generated in situ.

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Note that the present claims require determining hydrogen only, no other determining is claimed.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Each of the following applies in all occurrences.

There are many instances of lack of antecedent basis in the claims, for example in claim 1 line 1, "the state", line 2 "the culture's". In claim 1(c) last line, "obtain data regarding H<sub>2</sub> as a function of time" may be intended to be "H<sub>2</sub> production". In claim 1(d)(i) and (ii) are directed to data but no determining of such data is claimed. The only determining is of H<sub>2</sub>. In claim 1(d)(iii) the primes of F are not defined and "F" itself is not defined. In claim 8 "the in situ measurement of fluorescence" lacks antecedent basis because no such measuring is claimed. In claim 9 "the bioreactor" lacks antecedent basis. In claim 11 "said weak modulated probe pulse" lacks antecedent basis.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Melis (US 2003/0162273 A1) teaches hydrogen production.

Hankamer (US 2006/0166343 A1) teaches hydrogen production.

Melis (6,989,252) teaches hydrogen production.

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Anastasios (US 2001/0053543 A1) teaches hydrogen production.

Layzell (5,965,801) teaches continuously determining hydrogen from growth media with a semiconductor analyzer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ralph Gitomer whose telephone number is (571) 272-0916. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jon Weber can be reached on (571) 272-0925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Ralph Gitomer  
Primary Examiner  
Art Unit 1657